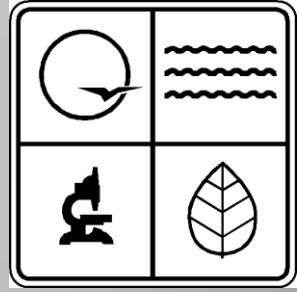


The Missouri Departments of  
Health and Senior Services  
& Natural Resources  
Onsite Wastewater Stakeholders Meeting  
March 6, 2014



# Onsite Wastewater Stakeholders Meeting

Mark Jenkerson, DHSS, Environmental Health Services

Jim Gaughan, DHSS, Onsite Wastewater Program

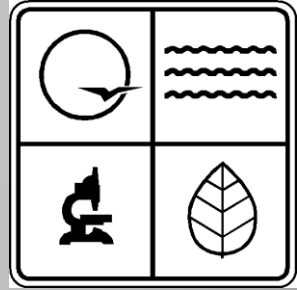
Jennifer Hoggatt, DNR, Our Missouri Waters

Charles Harwood, DNR, Soil Scientist

Nancy Hoffman, DHSS, Community and Public Health



# AGENDA



- I. Welcome and Introductions, Nancy
- II. Agenda – additional items, Nancy
- III. O&M Guidelines for decentralized (onsite and cluster) systems, Mark
- IV. Responsible Management Entities (RMEs) for decentralized systems, Jim
- V. Break
- VI. Our Missouri Waters, Jennifer
- VII. Onsite system inspections/evaluations for real estate purposes, Jim
- VIII. Stakeholder Comments/Discussion
- IX. Wrap-up



# Decentralized (Onsite and Cluster) System Operation and Maintenance Guidelines

- Long needed public education
- Guidance, not a rule
- Put O&M into practice quicker
- Update/improve more frequently
- A reference for system owners
- A resource offered by installer, private inspector, permit authority, seller, realtor, etc.
- Help build service provider and RME sector



# **OPERATION AND MAINTENANCE GUIDELINES**



# Contents of Operation and Maintenance Guidelines

- Purpose and Scope
  - Introduction
  - Reasons for Maintaining Your System
- Component Chapters
- Troubleshooting System Problems
  - Management Models
  - Glossary
  - Diagram of System
  - Record Keeping Document



# Operation and Maintenance Guidelines

## Component Chapters

- Chapter 1: Septic Tanks
- Chapter 2: Aeration Treatment Units (ATU's)
- Chapter 3: Bio-filters
- Chapter 4: Wetlands
- Chapter 5: Lagoons
- Chapter 6: Pumps and Pump Tanks
- Chapter 7: Septic Tank Effluent Screen
- Chapter 8: Gravity Distribution Methods and Soil Dispersal Trenches
- Chapter 9: Pressure Distribution
- Chapter 10: Drip Dispersal
- Chapter 11: Curtain Drains
- Chapter 12: Holding Tanks



DRAFT - 3/6/14

## Chapter 1: Septic Tanks A Pretreatment Component

Homes not served by public sewers rely on individual onsite or small cluster wastewater treatment systems to treat and disperse household wastewater. Household wastewater includes both **graywater** and **blackwater**. Graywater is defined as water captured from nonfood preparation sinks, showers, baths, and clothes washing machines while blackwater is that portion of wastewater that originates from toilet fixtures, dishwashers and food preparation sinks.

Household wastewater contains human waste, dirt, food, toilet paper, soap, detergents and cleaning products; which includes dissolved nutrients, microorganisms and solid particles. Improperly maintained wastewater treatment systems can allow these substances to contaminate groundwater and/or surface water and pose a health hazard.

A typical onsite wastewater treatment system has four main components: a sewer pipe from the house, a septic tank, a soil treatment system, and the soil under and around the treatment system. The septic tank is a buried, watertight tank designed and constructed to receive all household wastewater and provide primary treatment. After receiving limited treatment in the septic tank, wastewater is distributed and dispersed

into the soil for final treatment. Then clean water, filtered by the soil, recharges streams, lakes and groundwater in the area.

### How a Septic Tank Works

Primary treatment means the septic tank provides short-term storage and time for the wastewater to separate into layers. Tees, or baffles, provided at the septic tank's inlet and outlet are essential to the function of the tank. When raw wastewater enters the tank, the inlet tee slows the incoming wastes, reducing turbulence so that heavier solids can settle to the bottom of the tank and form a sludge layer. Lighter solids, such as grease and paper, float to the surface and form a scum layer. The outlet tee keeps the sludge and scum in the tank. During this storage period bacteria digest organic material in the wastewater and reduce the volume of solids that are present.

As new wastewater enters the tank through the inlet tee, an equal amount of clarified wastewater is pushed out of the tank through the outlet tee. The wastewater that leaves the tank has been partially treated but still contains disease-causing bacteria and other pollutants and receives further treatment in the soil treatment area. The **scum** and **sludge** layers





## DID YOU KNOW?

Bacteria and other microorganisms, which are naturally present in all septic tanks, are responsible for the beginning phase of digesting and treating wastewater generated from your house. Therefore, it is important to understand how detergents, chemicals and other substances can impact the health of your septic tank system.

### SAFE- IN MODERATION

Most detergents are intended to be mixed with water and may remain suspended in the wastewater until it reaches the soil treatment area. However, if used in accordance with manufacturer's label, detergents break down over time in a properly functioning onsite wastewater treatment system and do not impact surface or groundwater.

Diluted, normal use amounts of hand soap, bar soap, dish detergent, shampoo, multi-surface cleaners and laundry detergent are examples that are safe for onsite wastewater treatment systems.

Disinfectants and antimicrobials such as bleach, pine cleaners, quaternary ammonium-based products, and alcohol-based products are generally safe for onsite wastewater treatment systems if used in moderation and in accordance with manufacturer's label.

### NOT SAFE

In general, drain cleaners, concentrated cleaners/disinfectants, degreasers, and specialty cleaners such as oven cleaner are not safe to use with onsite wastewater treatment systems. They can disrupt the bacteria and other microorganisms in the system that break down nutrients and eliminate pathogens.

retained and stored in the tank accumulate over time and eventually must be pumped out.

Septic tanks provide reliable, but limited treatment of wastewater. The United States Environmental Protection Agency has established five management models with progressively increasing management controls as sensitivity of the environment and/or treatment system complexity increases. **Management Model I** specifies appropriate program elements and activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity.

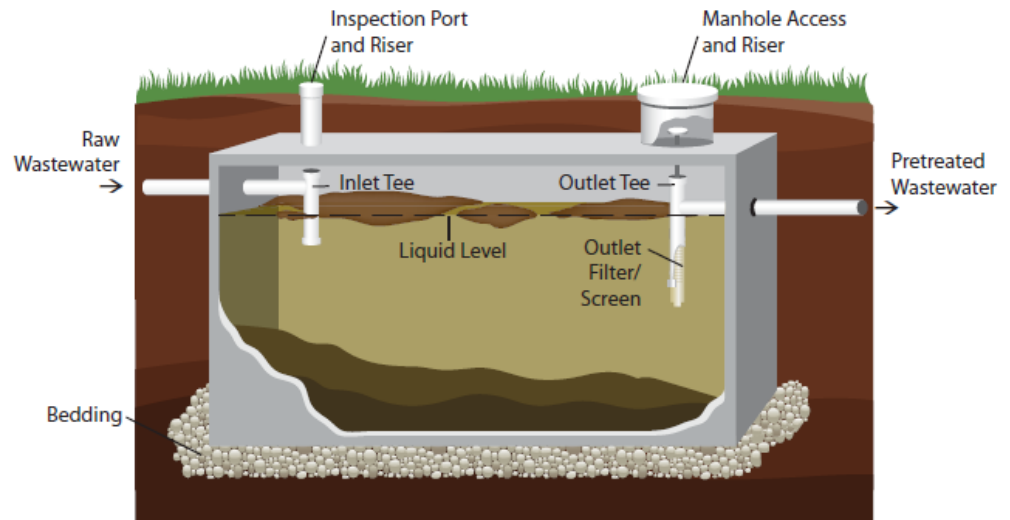
The objective of this model is to ensure that:

- Conventional systems are designed and installed in accordance with appropriate state and local regulations.
- Homeowners are knowledgeable of their particular system and provide routine maintenance (inspections and pumping) necessary for the system to operate properly.
- Homeowners repair their malfunctioning system, if needed, in accordance with Missouri law.

This model is generally appropriate for septic tank systems. However, in some sensitive environments, septic tanks can also be used as a component of a more advanced system for which **Management Models II, III or IV** may be recommended.

## Design and Construction

- Septic tanks are typically made of concrete, fiberglass or plastic. Installation of metal septic tanks is no longer allowed.
- Septic tanks need to be located:
  1. On firm, bedding material capable of bearing the weight of the tank and its contents.
  2. In an area easily accessible for the removal of liquids and accumulated solids.
  3. To meet the set back distances specified in 19 CSR 20-3.060 Minimum Construction Standards for Onsite Systems.
- The size or liquid capacity of a septic tank is important for wastewater separation and storage. For a single-family house, the liquid capacity is based upon the number of bedrooms with a minimum capacity of 1,000 gallons.



**Septic Tank.** A septic tank provides primary treatment of wastewater; solids are separated from liquid and some anaerobic digestion occurs.

### **Maintenance**

Regular maintenance is essential for getting the best performance from your septic tank system. If too much **sludge** and **scum** are allowed to accumulate in the tank, the incoming wastewater does not have adequate time to settle, causing solids to flow into the soil treatment system and clog dispersal trenches. If this occurs, wastewater can overflow onto the ground surface or backup into the house, where it exposes people and animals to disease-causing organisms. To prevent this from occurring, it is important to inspect your tank regularly and have it serviced when needed. Septic tanks should have inspection access over the inlet and outlet tees/baffles. All tanks have manholes for inspecting and pumping; minor excavation work may be needed to uncover the manhole.

### **Inspections**

Septic tanks must be inspected at least every two years. If the system has an **effluent screen** or the system serves a non-residential establishment, the

tank should initially be inspected at least annually. The inspection may be conducted by the homeowner, a registered onsite wastewater treatment system professional or other qualified service provider. The inspection should include assuring:

1. The septic tank is structurally sound with no corrosion, cracking, or missing parts.
2. There are no signs of water intrusion.
3. The septic tank, risers, manhole, access ports, lids, and covers are watertight.
4. Lids and covers are locked or otherwise secured to prevent accidental entry.
5. The inlet and outlet tees or baffles are in good condition and functioning properly.
6. If present, effluent screens are in good condition and not clogged.
7. The **scum** and **sludge** layers are at an acceptable thickness.



## Pumping

Correctly sized septic tanks are designed to accumulate solids for several years under normal conditions. As solids fill up the tank, wastewater has less time to separate properly and solid particles could flow out of the tank into the dispersal trenches. If the tank is not periodically pumped out, these solids will enter the soil treatment system; clogging the system to a point that a new soil treatment area may be needed.

It is the responsibility of the homeowner or user of the septic tank system to contract with a **registered onsite wastewater treatment system professional** or other **qualified service provider** for the removal of the septic tank contents when needed. There are three main factors which determine the frequency at which a septic tank must be pumped.

1. The liquid capacity of the tank.
2. How much water flows through the system, usually related to the number of people in the household.
3. The volume of the solids in the wastewater usually related to the use of a garbage disposal.

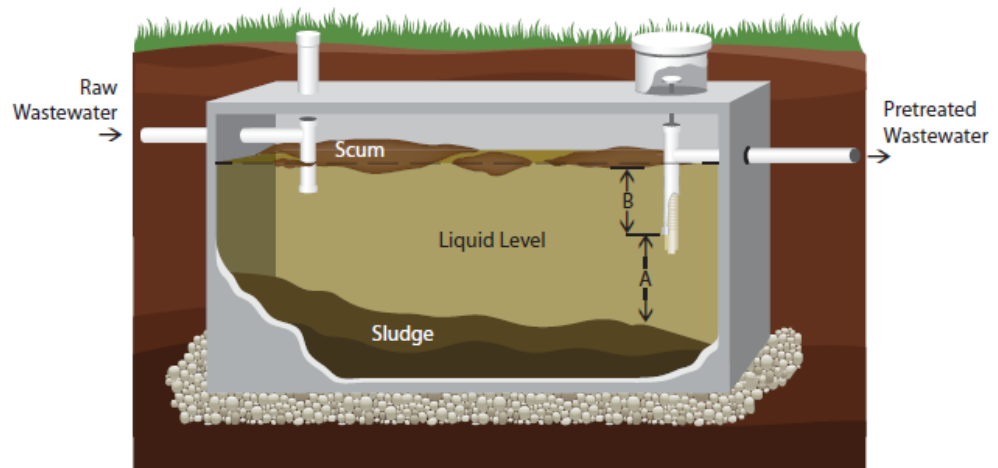
A septic tank must be pumped when the top of the sludge layer is no closer than twelve inches below the bottom of the outlet tee or when the bottom of the scum layer is no closer than three inches above the bottom of the outlet tee. A typical 1,000 gallon septic tank serving a three bedroom home may need to be pumped roughly every two to five years; if the home has a garbage disposal, the tank generally needs to be pumped twice as often.

The registered onsite wastewater treatment system professional or other qualified service provider is responsible for the proper treatment and disposal of all hauled wastewater by transporting to a municipal sewage treatment plant capable of receiving the waste; transporting to a sludge handling facility that possesses a current and valid permit issued for such activity; or land applying under a current and valid permit for such activity.



### **DID YOU KNOW?**

In order to ensure individuals are properly trained, the Missouri Department of Health and Senior Services registers several types of onsite wastewater treatment system professionals. For more information about installers, onsite soil evaluators, onsite system inspectors/evaluators, and percolation testers please go to <http://health.mo.gov/living/environment/onsite/professionals.php>



**Septic Tank.** Contract for removal of solids from the septic tank when sludge is 12 inches or less from bottom of outlet [A] or when scum is 3 inches or less from bottom of outlet [B].

### Final Treatment and Dispersal

Although properly operated and maintained septic tanks are effective at providing primary treatment, the treatment is limited and wastewater leaving the tank must receive further treatment before it is ready to be returned to the environment. Methods for final treatment and dispersal include discharge to a soil treatment system or a lagoon.

### Warning Signs of System Malfunctioning

While proper use, inspections and maintenance should prevent most septic tank problems, it is still important to be aware of changes in your septic tank system and to act immediately if you suspect the system is malfunctioning. The most obvious onsite system failures are easy to spot.

- Surfacing sewage, pooling water or muddy soil around your soil treatment system or in your basement.
- Plumbing or septic tank backups.
- Slow draining fixtures.

- Gurgling sounds in the plumbing system.
- Sewage odors in the house or yard.
- Localized overgrowth of lush green grass in or near the soil treatment area.
- Tests show the presence of bacteria in well water.

When partially treated wastewater comes into contact with groundwater, the onsite system has failed. This type of failure is not easy to detect, but can result in the pollution of wells, nearby streams or other bodies of water.

If you notice any of these signs, or you suspect your septic tank system may be having problems, contact a **qualified service provider** or the **local onsite wastewater authority** for assistance.





## Septic Tank Do's and Don'ts

Proper operation and maintenance of an onsite system can prevent costly repairs or replacement can protect your property value. Observing the following recommendations will help to keep your system operating properly.

### DO'S

1. Obtain the necessary permits from the appropriate administrative authority before making any repairs.
2. Use **registered onsite wastewater treatment system professionals and qualified service providers.**
3. Conserve water to avoid overloading the onsite system, use high-efficiency fixtures and promptly repair any leaky faucets or toilets.
4. Have your septic tank inspected annually if it has an effluent screen or every two years if it does not.
5. Have your septic tank pumped routinely. Pumping your septic tank when needed may be the single most important thing you can do to protect your soil treatment system and your investment.
6. Divert other sources of water, like roof drains, house footing drains and sump pumps away from the soil treatment area.
7. Landscape the system properly. Plant grass over and near the soil treatment system; roots from nearby trees or shrubs might clog and damage the system.
8. Contact a qualified service provider if you experience problems with your system, such as surfacing wastewater in your yard or other warning signs the system may be malfunctioning.
9. Keep detailed records regarding the system—its location, make/model, contract service agreement, service visits and maintenance performed.
10. Use commercial bathroom cleaners and laundry detergents in moderation and only according to manufacturer's directions.
11. Keep your septic tank accessible for inspections and pumping; yet locked or otherwise secured to prevent accidental entry.
12. Have your private water well tested periodically or if you experience any warning signs of the system malfunctioning (contact your **local public health agency**).

### DON'TS

1. **Don't enter a septic tank.** Poisonous gasses or a lack of oxygen can be fatal.
2. Your septic tank system is not a trash can. Don't put dental floss, feminine hygiene products, condoms, diapers, cotton swabs, cigarette butts, coffee grounds, cat litter, paper towels, latex paint, pesticides or other hazardous chemicals into your system.
3. Don't use caustic drain openers for a clogged drain. Instead, use boiling water or a drain snake to open clogs.
4. Don't drive or park vehicles or allow livestock on any part of your septic tank system. Doing so can compact the soil in your soil treatment area or damage the pipes, tank or other onsite system components.
5. Don't build over any part of your septic tank system; this includes patios, carports and other structures.
6. Don't attempt to pump your own septic tank; use the services of a qualified service provider.

### RESOURCES

Missouri Department of Health and Senior Services  
Onsite Wastewater Treatment  
<http://health.mo.gov/onsite>

19 CSR 20-3.060 Minimum Construction  
Standards for On-Site Sewage Disposal Systems  
[www.sos.mo.gov/adrules/csr/current/19csr/19c20-3a.pdf](http://www.sos.mo.gov/adrules/csr/current/19csr/19c20-3a.pdf)

Local Public Health Agencies – Map  
<http://health.mo.gov/onsiteauthoritymap.pdf>

Local Public Health Agencies  
<http://health.mo.gov/printablelisting.pdf>

EPA Septic Smart  
<http://water.epa.gov/infrastructure/septic/septicmart.cfm>



# Operation and Maintenance Guidelines

- Questions/Discussion??



# **RESPONSIBLE MANAGEMENT ENTITIES**



# Decentralized Systems

## 1997 US EPA Response to Congress on Use of Decentralized Wastewater Treatment Systems:

Adequately **managed** decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas.





## Responsible Management Entity (RME)

- Owners are responsible for their **individual** onsite wastewater system
- Owner responsibility often ineffective for **clustered** onsite wastewater systems



## Responsible Management Entity (RME)

- A legal entity responsible for providing various management services with the requisite managerial, financial, and technical capacity to ensure the long-term, cost-effective management of decentralized (onsite or clustered) wastewater treatment systems in accordance with applicable regulations and performance criteria.
- Compare to 'Continuing Authority' (DNR)



## Responsible Management Entity (RME)

- How to best develop/build the management capacity necessary?





# **INSPECTIONS AND EVALUATIONS**



# OWTS Inspections/Evaluations

- Time of sale or property transfer
  - Buyer or lender
  - County requirement

Year	Inspections	Evaluations	Evaluations as Percentage
2010	939	272	22.5
2011	960	271	22.0
2012	1361	239	14.9
2013	1254	212	14.5

- Other states



# OWTS Inspections/Evaluations

- In MO, two onsite wastewater treatment system assessment types
  - **Inspections** are more detailed: size and condition of tank(s), baffles, solids levels, hydraulic test
  - **Evaluations** are less detailed: observe odors, signs of surfacing, or discharge and check soil survey
  - For lagoons, the assessments are similar except for tank (if any)
  - Both include assessment of private water supply



# OWTS Inspections/Evaluations

- Complaints received and problems reported are more often related to evaluations
  - 50% complaints involved evaluations
  - Many questions received by program are related to confusion about the two assessment types
- Options?





# OWTS Inspections/Evaluations

- Options
  - No change
  - Limit use of evaluations
  - Phase out evaluations
  - Modify evaluations [and inspections]
  - Other suggestions?



# **STAKEHOLDER DISCUSSION**



# Stakeholders

- Send written comments and suggestions to:  
[OnsiteSewageProgram@health.mo.gov](mailto:OnsiteSewageProgram@health.mo.gov)
- Contact program at (573) 751-6095